BREEDING BIRD SURVEY OF COASTAL ISLANDS OF THE OUTER MACKENZIE DELTA AND NORTHERN TUKTOYAKTUK PENINSULA, 1987

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ABSTRACT

Helicopter surveys for colonial nesting birds on islands along the Canadian southern Beaufort Sea coast were conducted on June 27 and 28, 1987. Ten islands were searched by foot yielding 446 Glaucous Gull nests at 7 islands, 78 Common Eider nests at 8 islands, 5 King Eider nests at one island, 41 Brant nests at 5 islands, plus a few nests of Sabine's Gulls, Arctic Terns and Oldsquaw. Most of the Glaucous Gulls were at three sites: 249 nests at Escape Reef; 101 nests south of Hooper Island; 66 nests at a small island northeast of Hutchison Bay. Thirty-one of the Brant nests were at a second small island northeast of Hutchison Bay. Timing of Glaucous Gull nesting appeared to be more advanced at western colonies than at eastern colonies. Sample sizes for Brant and eiders were not large enough to assess differences in nest initiation throughout the study area. Locations at which no birds or minimal numbers of birds were observed are indicated on maps of the study area.

RÉSUMÉ

Des relevés d'oiseaux nicheurs coloniaux sur des îles le long de la côte sud du secteur canadien de la mer de Beaufort ont été effectués par hélicoptère les 27 et 28 juin 1987. Des recherches ont été faites à pied sur 10 îles, au cours desquelles on a localisé 446 nids de Goélands bourgmestres sur 7 îles, 78 nids d'Eiders à duvet sur 8 îles, 5 nids d'Eiders remarquables 1 île, 41 nids de Bernaches cravants sur 5 îles et quelques nids de Mouettes de Sabine, de Sternes arctiques et de Canards kakawis. Les Goélands bourgmestres étaient, en majorité, concentrés à trois endroits: 249 nids se trouvaient sur le récif Escape, 101 dans le sud de l'Île Hooper et 66 sur une petite île au nord-est de la baie de Hutchison. Trente-et-un (31) nids de Bernaches cravants se trouvaient sur une autre petite île au nord-est de la baie de Hutchison. Les Goélands bourgmestres dans les colonies du secteur ouest semblaient nicher plus tôt que dans celles du secteur est. La taille des échantillons de Bernaches cravants et d'eiders n'était pas assez considérable pour établir si le moment de la nidification variait dans l'ensemble du secteur visé par l'étude. On a indiqué sur les cartes du secteur les endroits où les oiseaux se trouvaient en très petit nombre ou bien étaient absents.

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1.0 INTRODUCTION

In the past, there have been few surveys for colonial nesting birds along the coast of the Canadian south Beaufort Sea. One, specifically for Glaucous Gulls, was conducted in 1973 and 1974 by Barry and Barry (In prep.), and a second was conducted by D.L. Dickson and T.W. Barry (Canadian Wildlife Service [CWS]) in 1984. In addition, T.W. Barry, through over 30 years of work in the area (with the Canadian Wildlife Service), has opportunistically developed a considerable appreciation of the state of colonial nesting in the Beaufort Sea. Information from both the above sources, and from a few other studies of more restricted coverage, has been reviewed and is presented in Alexander et al. (1988).

The present study was initiated to: 1) provide corroborating information to the above studies from ground counts at specific important colonies, and 2) examine more thoroughly the many small islands along the north coast of the Tuktoyaktuk Peninsula for unreported colonies.

2.0 METHODS

On June 27, 1987, Glaucous Gull (Larus hyperboreus) colonies at Escape Reef, Yukon Territory, and south of Hooper Island in the outer Mackenzie Delta, Northwest Territories, were visited by helicopter (Figure 1). The two colonies were walked by three people to obtain a tally of all nests. Clutch size and species were recorded for each nest. One egg of each nest was marked to avoid duplicate counts in areas of dense nesting.

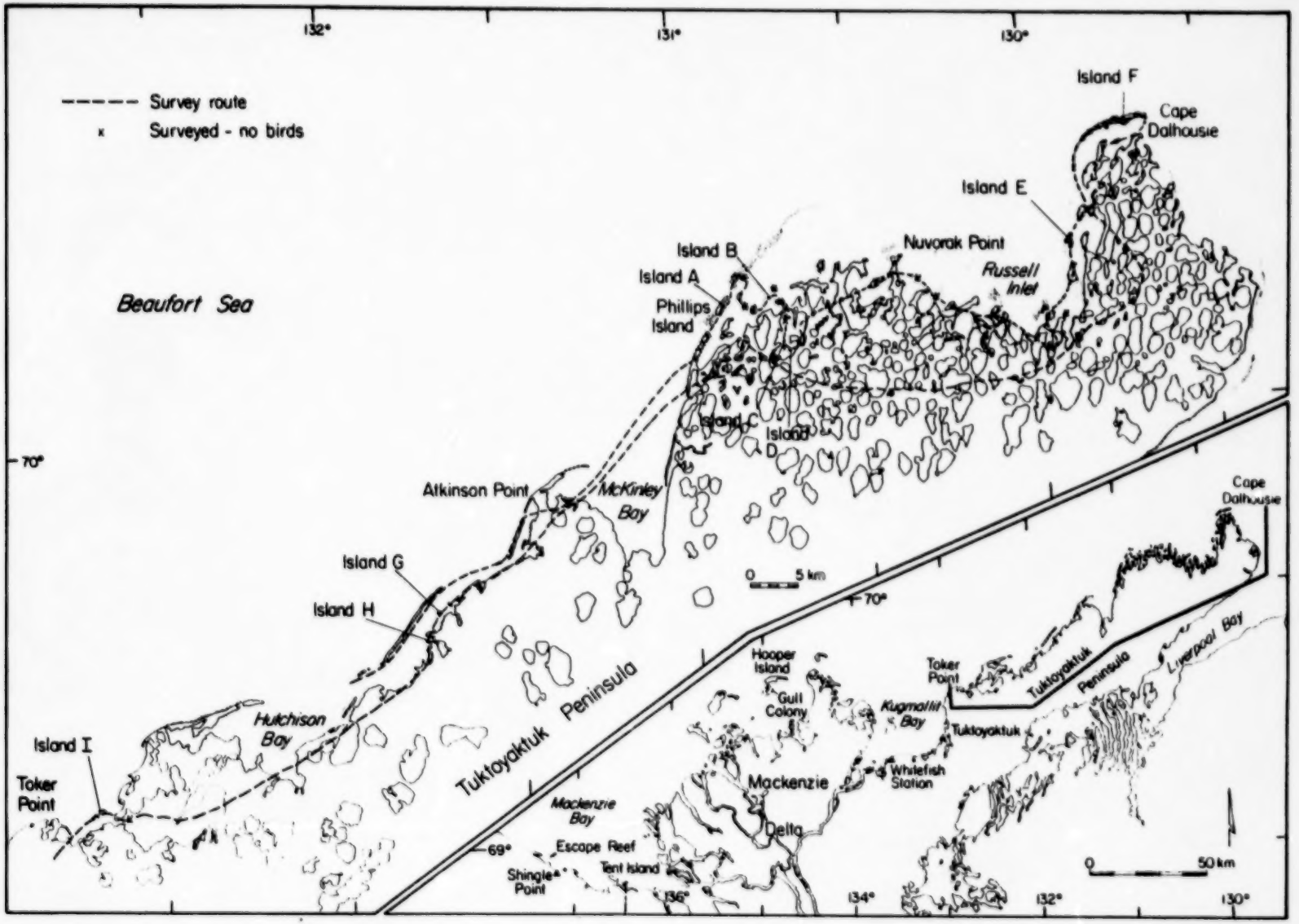

Figure 1. Map of the study area showing locations of Escape Reef, the gravel bar south of Hooper Island, and Islands A to I.

On June 28, 1987, an extensive survey for islands used by colonial nesting birds was flown along the north coast of the Tuktoyaktuk Peninsula from Tuktoyaktuk to Cape Dalhousie, Northwest Territories (Fig. 1). The flight path was restricted mainly to barrier beaches and other islands. Most islands were indicated on standard National Topographic Series (NTS) 1:250000 maps, but some were not. The locations of "unmapped" islands are noted on Figure 1. In a few instances, islands on the NTS maps had either washed away or had become joined to the mainland. All discrepancies were found on the Cape Dalhousie map sheet (NTS map 107E), which was produced from aerial photographs taken in 1950.

One observer on either side of the helicopter watched for concentrations of birds and potential colony islands. Each island was examined from the air. If birds were noted, a ground search of the island was made as described above. At some locations a photograph was taken prior to landing to aid in estimation of the number of gulls present. Visual estimates were also made prior to landing. Glaucous Gulls are scattered nesters along some barrier beaches and islands. In such situations birds were counted from the air by the primary author and nests noted when possible.

3.0 RESULTS AND DISCUSSION

The locations of survey routes and nesting islands are shown on Figure 1. Locations at which no birds were observed from the air are marked with an "X". Notes taken during the surveys but not presented formally in the sections that follow are found on the figure in the Appendix.

3.1 Glaucous Gulls

Glaucous Gulls were the most common nesting birds observed. A total of 446 nests were recorded during ground searches (Table 1). At eastern sites it was apparent that many birds had not initiated laying by the time of our survey. During an aerial count of birds on the spits and bars between Hutchison Bay and Atkinson point and on an island off Toker Point, an additional 89 possible nests were located (based on observations of sitting birds, and in a few instances, clear observation of a nest). The spits, marked 1 through 4 on Figure 2, had the following counts of possible nests and adult birds: 1) 2, 15; 2) 34, 98; 3) 40, 125; 4) 3, 15. On Toker Point Island I (Fig. 1), a count of 10 possible nests and 19 adults was made.

Timing of nesting was likely more advanced at the western colonies than at eastern colonies (i.e., average nest initiation date was likely earlier at western colonies). Average clutch size was 2.20 ± 0.75 (S.D.) at western colonies, whereas at eastern sites it was only 1.50 ± 0.57 (S.D.) (Table 1). Glaucous Gulls tend to lay complete clutches of three eggs. Strang (1976: 27) reported mean clutch sizes at Alaskan Bering Sea coastal colonies of 2.67 ± 0.67 and 2.74 ± 0.71 in 1972 and 1973 respectively (Table 2). At Whitefish Station on the western outer edge of the Mackenzie River delta (see Fig. 1) Hawkings (1986) reported that 3% and 15% of the nests were one and two-egg clutches, respectively, and that three-egg clutches accounted for 82% of the nests laid during 1985. The average clutch size at Whitefish Station was 2.80 ± 0.46. At Escape Reef and south of Hooper Island only 20% of the nests were at the one-egg stage while 80% of the nests were equally divided between two and three-egg

Table 1. Location and clutch-size distributions of Glaucous Gull nests at select sites in the Canadian Beaufort Sea, June 27 and 28, 1987. Refer to Figure 1 for island locations.

Location	Clutch size 1	2	3	Total no. of nests	Total no. of eggs	Mean clutch size	Est. no. adults	No. nests per adult
Escape Reef (central portion)	45 (21)[a]	104 (48)	67 (31)	216	454	2.10	423[b]	0.51
Escape Reef (peripheral)	5 (15)	11 (33)	17 (52)	33	78	2.36	—[c]	
S. of Hooper Is.	19 (19)	27 (27)	55 (54)	101	238	2.36	99	1.02
West Total	69 (20)	142 (40)	139 (40)	350	770	2.20	522	0.61[d]
Island A W. Nuvorak Pt.	2 (100)	-	-	2	2	1.00	62	0.03
Island B W. Nuvorak Pt.	8 (62)	5 (38)	-	13	18	1.38	67	0.19
Island C W. Nuvorak Pt.	2 (29)	4 (57)	1 (14)	7	13	1.86	97	0.07
Island D W. Nuvorak Pt.	4 (50)	4 (50)	-	8	12	1.50	87	0.09
Island E Russell Inlet	no active nests but several scrapes						37	0.00
Island F Cape Dalhousie	no nests, signs of nesting or adult birds							
East Total	16 (53)	13 (43)	1 (4)	30	45	1.50	350	0.09
Island G E. Hutchison Bay (=Central Total)	17 (26)	39 (59)	10 (15)	66	125	1.89	200[b]	0.33
Island H E. Hutchison Bay	no nests or signs of nesting							

[a]Proportion of nests in particular clutch size class.
[b]Estimate from aerial photograph of colony prior to ground search.
[c]Estimate not available.
[d]Value excludes 33 nest found on peripheral portion of Escape Reef.

Table 2. Glaucous Gull clutch-size data from other studies in the Beaufort and Bering seas.

Location Date	Clutch size 1	2	3	4	Total no. of nests	Total no. of eggs	Mean clutch size	Standard deviation	Source
Bering Sea coast (colonies)									
1972	-	-	-	-	45	-	2.67	0.67	Strang 1976
1973	-	-	-	-	85	-	2.74	0.71	Strang 1976
Bering Sea coast (isolated pairs)									
1972	-	-	-	-	16	-	2.50	0.67	Strang 1976
1973	-	-	-	-	23	-	2.65	0.63	Strang 1976
1974	-	-	-	-	8	-	2.88	0.65	Strang 1976
Escape Reef June 27, 1984	13	60	200	5	278	753[a]	2.71	0.58	D.L.Dickson unpubl. data
Whitefish Station 1985	2 (3)	12 (15)	65 (82)	-	79	221	2.80	0.46	Hawkings 1986
Tip of Tuk.[b] Peninsula July 26-28, 1981	1	8	1	-	10	20[c]	2.00	0.47	D.L. Dickson unpubl. data

[a]Includes 35 young
[b]From two small islands. Other gulls had already hatched and left the nest site.
[c]Includes 7 young.

clutches. At West Nuvorak Point Islands A to D, along the tip of the Tuktoyaktuk Peninsula, 53% of the nests were at the one-egg stage, 43% had two eggs, and only 4% had three eggs. Island G, near Hutchison Bay, appeared to be at an intermediate stage with a low percentage of one-egg clutches (26%) and three-egg clutches (15%) and a higher proportion of two-egg clutches (59%). Further indication of a negative west to east trend in nest initiation is the ratio (no. nests):(estimated no. adults). For the west, central and eastern regions the ratios are 0.61, 0.33 and 0.09, respectively. The ratio for the eastern region includes 37 adults observed at Russel Inlet Island E. There were many signs of past and potential nesting on Russel Inlet Island E but no active nests were found.

We suggest that the advanced nesting at Escape Reef and Hooper Island, relative to eastern colonies, was primarily in response to the abundant open water generated by the Mackenzie River effluent, and to climatic differences between the two areas. The outer Mackenzie Delta and Escape Reef area was clear of landfast ice by mid-June (from satellite images provided by the Atmospheric Environment Service of Environment Canada). At the eastern end of the study area landfast ice was extensive into July. Most islands were, however, encompassed by a narrow ring of open water, and many of the small bays formed by the convoluted coastline of the Russel Inlet area were ice-free. Snow and pond-ice melt was retarded in eastern regions relative to western regions (pers. obs.), which concurs with temperature isotherm patterns outlined by Burns (1973). Furthermore, the warmer delta environment tends to be frost-free earlier than the Russel Inlet area (mean date of last frost is June 20 for

Mackenzie Delta area and July 10 for Russel Inlet area) (Burns 1973). Open water from the Mackenzie River influence would provide productive and easily accessible foraging habitat starting in early to mid-June, and the warmer climate may reduce maintenance energy requirements for local birds. Thus more energy could be channeled earlier into egg production and nesting activities.

Escape Reef is the largest Glaucous Gull colony in the Canadian Beaufort Sea. In late June 1984, a total of 278 active nests were found on the reef (Alexander et al. 1988). Our surveys yielded a similar count of 249 nests. It is likely that some nests had not been initiated by the time of our search. Of the nests found in 1987, 216 were situated on the small, raised and well-vegetated central portion of the reef (a photograph of this part of the colony can be found on page 65 of Barry et al. 1981). In the past, most reports of nesting at Escape Reef have been restricted to aerial counts of adult birds. The numbers seen have ranged from 110 in June 1974 (Alexander et al. 1988) to 313 late July 1981 (Dickson 1985). See Hawkings (1987), page 41 for further review.

One hundred and one nests were found on the bar south of Hooper Island. Reports of this colony are restricted to aerial counts of adult birds by Slaney (1975): 170 birds were observed in 1972, and 40 birds in 1974. According to the 1987 results, this is one of the most substantial colonies in the Mackenzie Delta region although in some years there is no nesting at all (see Alexander et al. 1988:61).

The next most substantial colony was at East Hutchison Bay Island G. At this colony 66 nests were counted. There was some indication that laying was not complete. Previously this colony was reported to consist of

20 to 40 pairs of nesting birds (Alexander et al. 1988). There are several other colonies in the Canadian Beaufort Sea of similar size that were not surveyed in 1987. Of particular note are colonies at Kidluit Bay, in southwestern Liverpool Bay, and at the Anderson River delta (see Alexander et al. 1988).

Given that colonies examined in 1987 along the tip of the Tuktoyaktuk Peninsula appeared to be at an early stage in laying, it is not very meaningful to compare results with previous reports, except for one point. Glaucous Gull (or other bird) colonies have not previously been reported on West Nuvorak Point islands B, C and D (Alexander et al. 1988).

During our surveys, all possible Herring Gulls (Larus argentatus) or Herring X Glaucous hybrids were noted (see Spear 1987). Only seven such birds were identified, six at Escape Reef and one south of Hooper Island. None were observed east of the Mackenzie Delta.

3.2 Sabine's Gulls and Arctic Terns

Sabine's Gulls (Xema sabini) were observed nesting at Russel Inlet Islands E and Cape Dalhousie Island F. At Island E, 23 adults were counted but only five nests were found (four with one egg and one with three eggs). Many scrapes were also noted. At Island F, 60 Sabine's Gulls and Arctic Terns were counted from the air in a mixed flock flying helter-skelter over the island. We did not attempt to search Island F because of the difficulty finding unattended tern and Sabine's Gull nests scattered throughout this extensive areas. However, nine sitting Sabine's Gulls were observed from a tower situated on the island. In addition, approximately 40 Sabine's Gulls were also noted at the far west end of the islands that stretch west from Cape Dalhousie Island F.

These sites constitute the main breeding ground for Sabine's Gulls in the Canadian Beaufort Sea. At Russel Inlet Island E, 125 adults and 17 young were observed in July 1981, and the Cape Dalhousie Island F region is occasionally used by 50 to 100 birds (Alexander et al. 1988). Apparently, large numbers were found nesting around a large lake near Cape Bathurst in 1912 (Anderson 1913); however, we are not aware of any more recent accounts of nesting in the Cape Bathurst region.

Substantial numbers of Arctic Terns (Sternus paradisaea) were noted at only two locations. Fifty birds were counted from the air at an island just east of Phillips Island on the Tuktoyaktuk Peninsula (see Appendix for location). In the Cape Dalhousie Island F region, terns were observed along with the Sabine's Gulls mentioned above. From the tower on Island F, 25 sitting terns were observed. Both of these sites have been previously noted as Arctic Tern colonies. At the island east of Phillips Island, 120 adults and one young were observed in late July 1981, and in most years, 100 to 500 birds are present at the Cape Dalhousie colony (Alexander et al. 1988). In July 1981, 50 adults, 2 young and 2 nests were found at Russel Inlet Island E, whereas we did not observe any terns at this location.

3.3 Eiders

A total of 84 eider nests were found, 5 of which were judged to be King Eider (Somateria spectabilis) nests based on the type of down in the nest and the identification of one female (Table 3). All five nests were on East Hutchison Bay Island H. King Eider down is much darker than Common Eider (Somateria mollissima) down (Palmer 1976: 128), and the contrast is

Table 3. Location and clutch-size distributions of Common Eider nests at select sites in the Canadian Beaufort Sea, June 27 and 28, 1987 (and King Eiders on Island H). Refer to Figure 1 for island locations.

Location	Clutch size 1	2	3	4	5	6	Total no. of nests	Total no. of eggs	Mean clutch size
Escape Reef (=West Total)	-	-	-	1 (50)[a]	1 (50)	-	2	9	4.50
S. of Hooper Is.	no nests or signs of nesting								
Island A W. Nuvorak Pt.	6 (50)	5 (42)	1 (8)	-	-	-	12	19	1.46
Island B W. Nuvorak Pt.	2 (67)	1 (33)	-	-	-	-	3	4	1.33
Island C[b] W. Nuvorak Pt.	8 (31)	6 (23)	4 (15)	5 (19)	2 (8)	1 (4)	26	68	2.61
Island D W. Nuvorak Pt.	1 (6)	8 (50)	2 (13)	4 (25)	1 (6)	-	16	44	2.75
Island E Russel Inlet	3 (100)	-	-	-	-	-	3	3	1.00
Island F Cape Dalhousie							9[c]		
East Total (excluding F)	20 (33)	20 (33)	7 (12)	9 (15)	3 (5)	1 (2)	60	138	2.30
Island G E. Hutchison Bay	no nests or signs of nesting								
Island H E. Hutchison Bay (=Central Total)	1 (14)	1 (14)	1 (14)	2 (29)	-	2[d] (29)	7	33	3.33[e]
King Eiders Island H E. Hutchison Bay	-	-	2	2	1	-	5	19	3.80

[a]Proportion of nests in particular clutch-size class.
[b]Includes clutch of possible King X King or King X Common pair (see text).
[c]Count made from tower on island of sitting females.
[d]Includes one nest with 13 eggs.
[e]Excludes 13-egg clutch.

particularly evident when nests of both species are available for comparison, as was the case on Island H. King Eiders are normally scattered, inland nesters, but semi-colonial nesting on small islands has been reported (for a brief review see Palmer [1976] page 128). The average clutch size for the 5 nests was 3.80 ± 0.84 (S.D.) which is similar to the mean clutch size values reported for ten different years and six regions within the western Arctic archipelago (range of 4.0 to 5.25 and overall mean of 4.55 ± 0.42 (S.D.) as summarized by Lamothe [1973]).

A possible sixth King Eider nest was identified from two aerial photographs of West Nuvorak Point Island C. An adult male King Eider was easily seen to be stationed next to a sitting female eider. However, it was not possible to determine whether the female was a King or Common Eider, nor did we note particulary dark down in any of the nests during our ground search. Male King and female Common Eider matings are regularly observed at Common Eider colonies in Iceland (Pettingill 1959).

The remaining 78 nests were judged to be Common Eider nests. The distribution among islands is given in Table 3. The only islands without eider nests (island south of Hooper Island and East Hutchison Bay Island G) were both low-lying gravel islets with little vegetation or debris. Both islands were dominated by dense colonies of Glaucous Gulls (Table 1).

As with Glaucous Gulls, there appeared to be a negative trend in average clutch size from west to east indicating later initiation of nesting in eastern regions. However, given the minimal representation of nesting in the west, it is difficult to make any conclusive statements about relative timing of initiation. In general, our surveys were conducted prior to completion of laying, as indicated by an overall low

mean clutch size compared to other studies. The mean clutch size for all nests was 2.46±1.40. At Egg Island, on the Alaskan Beaufort Sea coast, Schamel (1977) reported for the 1972 season a mean clutch size of 5.3±1.3 eggs. Values summarized in Palmer (1976: 61) for the Common Eider (v-nigra) were "generally 5 eggs/clutch" along northwestern Canadian coastal areas, and 4.4 eggs/clutch in the New Siberian Islands.

3.4 Brant

A total of 41 Brant (Branta bernicla nigricans) nests were found during ground searches (Table 4). At a small island just south of East Hutchison Bay Island H an additional 22 adult Brant were seen, but from the air there were no apparent signs of nesting. Island H supported the only true colony: 31 active nests. This island was also utililzed by nesting eiders (Table 3) but not by Glaucous Gulls (Table 1). There are no reported records of this colony and so the consistency of it's occurrence is unknown.

In general, Brant colonies in the Canadian Beaufort Sea are small (<60 pairs), the exception being the Anderson River delta colony which consists of up to 2500 breeding birds (see Alexander et al. [1988] for review). In the Yukon, nesting Brant are very uncommon, and Escape Reef is one of the four known nesting sites (Hawkings 1987).

Table 4. Locations and clutch-size distributions of Brant nests at select sites in the Canadian Beaufort Sea, June 27 and 28, 1987. Refer to Figure 1 for island locations.

Location	Clutch size						Total no. of nests	Total no. of eggs	Mean clutch size
	1	2	3	4	5	6			
Escape Reef[a]	-	1	-	1	-	-	2[b]	6	3.00
(Central portion)[a]	(-)	(1)	(4)	(2)	-	-	(7)[c]	(22)	(3.14)
Island C W. Nuvorak Pt.	2	-	3	1	-	-	6	15	2.50
Island D W. Nuvorak Pt.	1	-	-	-	-	-	1[d]	1	-
Island G E. Hutchison Bay	one sitting bird left undisturbed						1	-	-
Island H E. Hutchison Bay	1	9	11	5	4	1	31	98	3.16
Total	4	10	14	7	4	1	41	120	2.93

[a]There were no nests found on peripheral portions of Escape reef. In parentheses, data from June 27, 1984 (D.L. Dickson, CWS, unpubl. data).
[b]Plus 5 predated nests.
[c]Plus 4 predated nests.
[d]Plus 1 predated nest.

4.0 CONCLUSIONS

Of the ten islands examined by foot, four West Nuvorak Point islands B, C, D, and East Hutchison Bay Island H along the Tuktoyaktuk Peninsula) had not been reported previously as providing habitat for colonial nesting birds. All four islands were small both in physical size and colony size. The total number of nests of all species at islands B, C, D and H was 16, 39, 26, and 45, respectively. However, islands B, C and D appeared to be at an early stage of nest initiation, and it is likely that more Glaucous Gulls would have laid nests after our survey. Given the number of adult birds seen at each of these colonies (Table 1), an additional 21, 41 and 35 nests could potentially be laid if all adults were to breed. Birds at East Hutchison Bay Island H appeared to be well into laying and therefore most birds that were going to nest had probably initiated by June 28. These islands were judged to be of moderate use when the criteria and ranking system of Alexander et al. (1987) was applied to them.

The gravel island south of Hooper Island (Figure 1) was designated as a "moderate use " area in Alexander et al. (1987). Given the high number of nests observed there on June 27, this island should be reclassified as a variable moderate to high use area (Alexander et al. 1988).

5.0 ACKNOWLEDGEMENTS

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APPENDIX

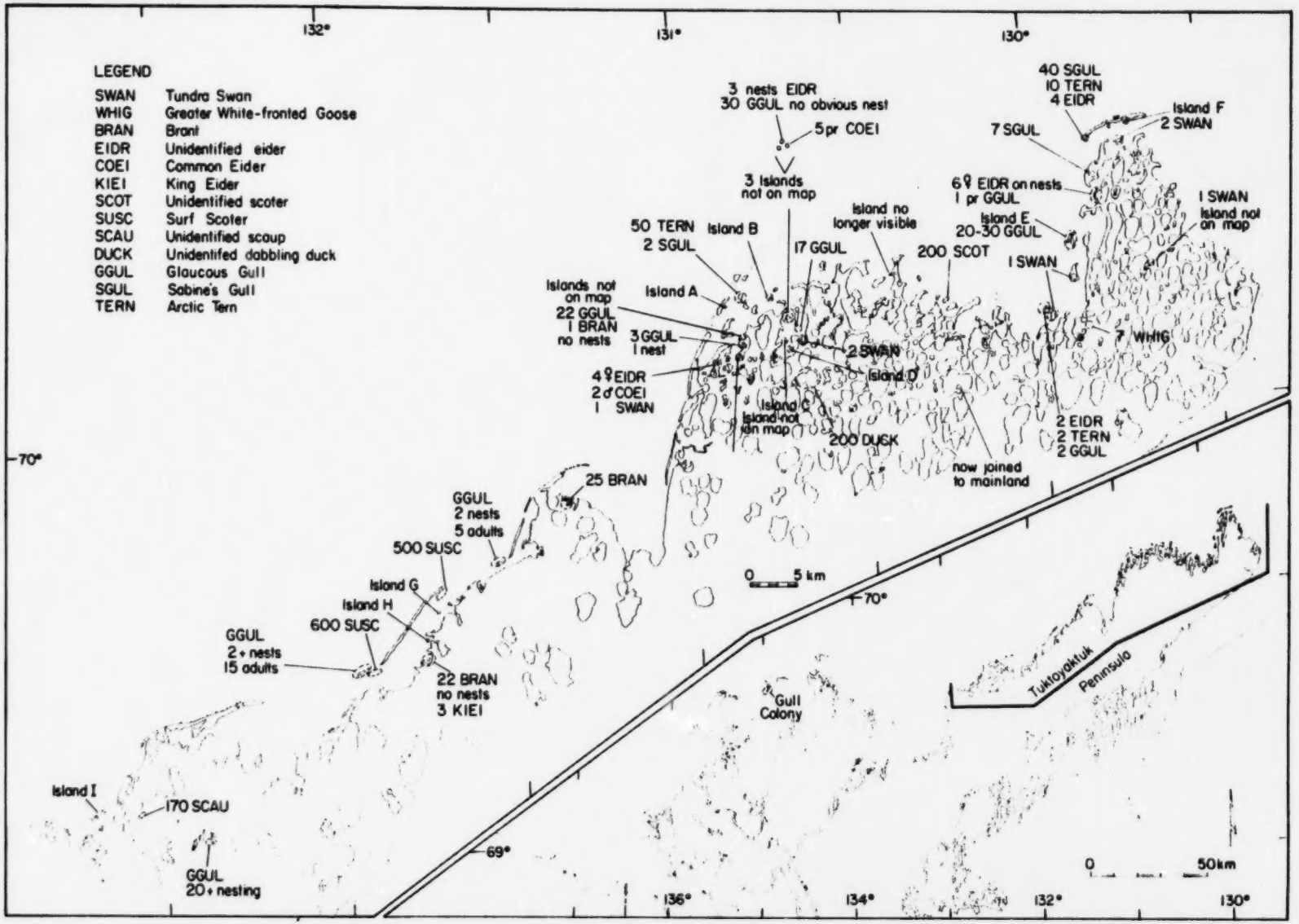

Figure A. Additional observations of birds along the north coast of the Tuktoyaktuk Peninsula, June 28, 1987.